PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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The Question of Experimental Granulomata.—KONSTANTINOWITSCH (*Virchow's Archiv*, 1901, vol. clxiii. p. 120) was induced on account of De Meser's case (cf. *supra*) to try the effect of injecting lycopodium spores into animals. He inoculated rabbits. In one case an abscess was produced. In another animal two firm nodules were formed, which reached the size of a hazel-nut after twelve days. One nodule was excised and examined after eighteen days; the other after forty-five days, when it had begun to diminish in size.

The first nodule was composed of proliferated connective tissue and endothelial cells, with numerous giant-cells. Lycopodium spores were present in large numbers, often in the protoplasm of giant-cells. The nodule itself was a granuloma due to the reaction produced by a foreign body.

The second nodule showed the same structure as the first, except that the granulation tissue was denser and more fibrillated.

R. Martin has injected lycopodium spores into the veins of animals, and found in the lungs small nodules composed of "embryonal cells"—*i. e.*, granulomata.

Numerous observers have injected blastomycetes into animals and produced granulomata. Hence one must be very cautious about accepting the conclusions of men who claim that blastomycetes are the cause of cancer.—E. H. N.

The Parasitic Theory of Cancer.—BORREL (*Annales de l'Institut Pasteur*, 1901, vol. xv. p. 49) gives an excellent brief review of the literature on the theory of the parasitic origin of cancer. He divides the work into three stages: 1. "Parasites" described by Neisser, Darier, and others, and believes that their "parasites" were epithelial cells undergoing special changes. 2. "Parasites" of the type described by Thoma, Sawtchenko, and others. These are intracellular bodies, round, single, or multiple, occurring chiefly within carcinomatous epithelium of glandular type. These bodies show a superficial resemblence to certain stages in the development of coccidia. Borrel believes that these bodies arise from peculiar changes which occur in the attractive sphere and centrosome of carcinoma cells. 3. "Parasites" believed by some men to be blastomycetes. Borrel says that the men who believe in this theory have assumed that all sorts of cell inclusions with a circular outline are blastomycetes, while in fact the inclusions have no morphological likeness to blastomycetes, and the infinite variety of cell inclusions even in carcinoma cannot all arise in the same way. The objections to the blastomycetic theory are: the nodules produced in animals by inoculation with blastomycetes are, with the exception of two cases of

Sanfelice (cf. *infra*), of mesoblastic type; most men, with decent asepsis in making cultures, do not obtain cultures of blastomycetes from carcinomata, and there is no evidence that yeasts are found within epithelial cells. Borrel analyzes Sanfelice's two "successful" cases, and decides that there is no evidence that the tumors were due to the action of blastomycetes.

Borrel's own contribution is a demonstration of the fact that bodies morphologically identical with the "parasites" of cancer are produced in normal and carcinomatous cells by certain peculiar changes in the attractive sphere and centrosome. He employs special technique in hardening and staining tissues. In the testicle of guinea-pigs the attractive sphere and the centrosomes of cells which are to become spermatozoa show stages of development in which they resemble the "parasites" seen in cancer cells. In the cells of carcinoma the attractive sphere with included centrosomes may give rise to exactly similar appearances. At times there comes a collection of portions of the sphere about each of several centrosomes, producing appearances like those seen in the "spore cyst" of various believers in the parasitic theory.

Hence, Borrel concludes that the so-called "parasites" are due to peculiar changes of the attractive sphere about the centrosome. He says that the theory of a parasitic cause is attractive, but that at present there is no evidence to support any of the theories.

Borrel's article is an excellent *résumé* of the status of the parasitic theory. His own work is very conclusive. The reviewer has seen his specimens, and can vouch for the accuracy of the plates.

[The three preceding articles are valuable additions to the literature that is accumulating to show that at present there is not the slightest evidence to prove that the peculiar bodies seen in epithelial cells of carcinomata are "parasites" of any sort—bacterial, coccidial, or blastomycetic. We are no nearer a demonstration of the cause of epithelial malignant tumors than before, and, if a parasitic cause ever is demonstrated, it will be along lines different from those pursued during the past ten years.]—E. H. N.

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